IN THE UNITED STATES DISTRICT COURT
FOR THE WESTERN DISTRICT OF TEXAS
AUSTIN DIVISION

PILOT ENERGY SOLUTIONS, L.L.C.,
Plaintiff,

-vs-

OXY USA INC.,
Defendant.

CAUSE NO.:
A-16-CA-00687-SS

MARKMAN ORDER

BE IT REMEMBERED on this day the Court reviewed the file in the above-styled cause, and specifically Plaintiff Pilot Energy Solutions, L.L.C. (Pilot)'s Opening Claim Construction Brief [#73] and Defendant OXY USA Inc. (Oxy)'s Response [#81] in opposition; Oxy's Opening Claim Construction Brief [#74] and Pilot's Response [#80] in opposition; the parties' Joint Claim Construction Chart [#91-1]; Pilot's Post-*Markman* Claim Construction Brief [#88] and Oxy's Response [#90] in opposition; Oxy's Post-*Markman* Claim Construction Brief [#89]; the Report and Recommendation (R&R) of the Special Master [#95]; Oxy's Objections [#96] and Pilot's Response [#100] in opposition; as well as Pilot's Objections [#97] and Oxy's Response [#101] in opposition. Having reviewed the documents, the governing law, the arguments of the parties at the *Markman* hearing, and the file as a whole, the Court now enters the following opinion and orders.

Background

This is a patent infringement lawsuit. At issue is United States Patent No. 8,816,148 (the '148 Patent), issued on August 26, 2014, and titled "Carbon Dioxide Fractionalization Process."

The '148 Patent relates to processing natural gas. Natural gas found in the ground is a mixture of different molecules, including water, carbon dioxide, and hydrocarbons, and must be refined to be commercially useful. *Markman* Hr'g Tr. [#94] at 130:24–131:7. Natural gas streams with relatively more heavy hydrocarbons are "heavy hydrocarbon streams," and streams with relatively fewer heavy hydrocarbons are "light hydrocarbon streams." *Id.* at 158:9–18, 159:2–21. Similarly, natural gas streams with relatively more carbon dioxide are "carbon dioxide-rich" streams, and streams with relatively less carbon dioxide are "carbon dioxide-lean" streams. *Id.* at 13:5–7.

Carbon dioxide is removed from a natural gas process through a sweetening process, which generally occurs in hydrocarbon sweetening facilities, such as Selexol plants. In recent years, however, the carbon dioxide levels in natural gas found in some west Texas fields has risen, while at the same time, the existing Selexol plants built to service these fields remained fixed in how much carbon dioxide they could separate from the hydrocarbon streams. Consequently, the only way to separate more carbon dioxide using existing technology was to build more Selexol plants, which "are very costly to build and operate." Pl.'s Post-*Markman* Brief [#88] at 3.

According to Pilot, the process embodied in the '148 patent was developed to address this problem and serve as a complement to a Selexol facility. The '148 Patent provides for a separation process in which a carbon dioxide-lean stream and a carbon dioxide-rich stream are separated from a light hydrocarbon stream. The carbon dioxide-lean stream is then fed into a Selexol plant, thereby "allow[ing] it to run within [] its original design limits." *Id.* at 4.

Oxy owns and operates a hydrocarbon gas processing plant in Pecos County, Texas, known as the Century Plant, which processes natural gas and produces methane gas and carbon

dioxide. Pilot claims Oxy's Century Plant infringes the '148 Patent by utilizing the separation process embodied in Claims 1, 3, 5, 6, 7, 8, 10, and 33 of the patent.

On March 22, 2017, the Court, through the Special Master, held a *Markman* hearing, and the Special Master issued his Report and Recommendation on claim construction on May 25, 2017. To the extent the parties have made specific objections to the Special Master's factual findings or legal conclusions, they are entitled to de novo review of those findings and conclusions. FED. R. CIV. P. 53(f).

Analysis

I. Claim Construction—Legal Standard

When construing claims, courts begin with "an examination of the intrinsic evidence, i.e., the claims, the rest of the specification and, if in evidence, the prosecution history." *CCS Fitness, Inc. v. Brunswick Corp.*, 288 F.3d 1359, 1366 (Fed. Cir. 2002); *see also Interactive Gift Express, Inc. v. Compuserve Inc.*, 256 F.3d 1323, 1327 (Fed. Cir. 2001).

The words in the claims themselves are of primary importance in the analysis, as the claim language in a patent defines the scope of the invention. *SRI Int'l v. Matsushita Elec. Corp.*, 775 F.2d 1107, 1121 (Fed. Cir. 1985) (en banc). The words of a claim "are generally given their ordinary and customary meaning." *Phillips v. AWH Corp.*, 415 F.3d 1303, 1312 (Fed. Cir. 2005). "[T]he ordinary and customary meaning of a claim term is the meaning that the term would have to a person of ordinary skill in the art in question at the time of the invention, i.e., as of the effective filing date of the patent application." *Id.* at 1313. The inquiry into how a person of ordinary skill in the art understands a claim term provides an "objective baseline" from which to begin claim interpretation. *Id.* The person of ordinary skill in the art is understood to read a claim term not only in the context of the particular claim in which the term appears, but in the context

of the entire patent, including the specification; thus, both the plain language of the claims and the context in which the various terms appear "provide substantial guidance as to the meaning of particular claim terms." *Id.* at 1314.

The specification also plays a significant role in the analysis. *Id.* at 1315. The Federal Circuit has repeatedly reaffirmed the principle that the specification "is always highly relevant. . . . Usually, it is dispositive; it is the single best guide to the meaning of a disputed term." *Id.* (quoting *Vitronics Corp. v. Conceptronic, Inc.*, 90 F.3d 1576, 1582 (Fed. Cir. 1996)). In interpreting the effect the specification has on the claim limitations, however, courts must pay special attention to the admonition that one looks "to the specification to ascertain the meaning of the claim term as it is used by the inventor in the context of the entirety of his invention, and not merely to limit a claim term." *Interactive Gift*, 256 F.3d at 1332 (internal quotation marks and citations omitted).

The final form of intrinsic evidence the Court may consider is the prosecution history. Although the prosecution history "represents an ongoing negotiation between the PTO and the applicant" and therefore "often lacks the clarity of the specification and thus is less useful for claim construction purposes," it can nonetheless "often inform the meaning of the claim language by demonstrating how the inventor understood the invention and whether the inventor limited the invention in the course of prosecution, making the claim scope narrower than it would otherwise be." *Phillips*, 415 F.3d at 1317.

Aside from the intrinsic evidence, the Court may also consult "extrinsic evidence," which is "all evidence external to the patent and prosecution history, including expert and inventor testimony, dictionaries, and learned treatises." *Id.* While extrinsic evidence "can shed useful light on the relevant art," the Federal Circuit has explained it is "less significant than the intrinsic

record in determining 'the legally operative meaning of claim language.'" *Id.* at 1317 (quoting *C.R. Bard Inc. v. U.S. Surgical Corp.*, 388 F.3d 858, 862 (Fed. Cir. 2004)). Extrinsic evidence in the form of expert testimony may be useful to a court for "a variety of purposes, such as to provide background on the technology at issue, to explain how an invention works, to ensure that the court's understanding of the technical aspects of the patent is consistent with that of a person of skill in the art, or to establish that a particular term in the patent or the prior art has a particular meaning in the pertinent field." *Id.* at 1318. However, conclusory, unsupported assertions by an expert as to the definition of a claim term are not useful, and should be discounted. *Id.* In general, extrinsic evidence is considered "less reliable than the patent and its prosecution history in determining how to read claim terms," although it may be helpful. Id.

The purpose of claim construction is to "'determin[e] the meaning and scope of the patent claims asserted to be infringed.'" *02 Micro Int'l Ltd. v. Beyond Innovation Tech. Co.*, 521 F.3d 1351, 1360 (Fed. Cir. 2008) (quoting *Markman v. Westview Instruments, Inc.*, 52 F.3d 967, 976 (Fed. Cir. 1995), *aff'd*, 517 U.S. 370 (1996)). Thus, "[w]hen the parties raise an actual dispute regarding the proper scope of these claims, the court, not the jury, must resolve that dispute." *Id.* However, "district courts are not (and should not be) required to construe every limitation present in a patent's asserted claims." *Id.* at 1362. For example, no construction is required if the requested construction would be "an obligatory exercise in redundancy," or if the "disputed issue [is] the proper application of a claim term to an accused process rather the scope of the term." *Id.* (quoting *U.S. Surgical Corp. v. Ethicon, Inc.*, 103 F.3d 1554, 1568 (Fed. Cir. 1997)).

II. Application

A. Special Master's Recommendations

The Special Master recommended the following construction of the claim terms:

Claim Term	Recommended Construction
Stream	The flow of materials within a boundary
Separate	No construction necessary
Hydrocarbon feed stream	A hydrocarbon-containing stream prior to separation into the light hydrocarbon stream and the heavy hydrocarbon stream
Light hydrocarbon feed stream	One of two streams resulting from the separation of the hydrocarbon feed stream, containing a decreased C3+ concentration compared to the hydrocarbon feed stream and wherein the other stream (the heavy hydrocarbon stream) is suitable for use or sale as natural gas liquids
Cooling the light hydrocarbon stream using at least a portion of the carbon dioxide-lean stream	Cooling the light hydrocarbon stream using at least a portion of the carbon dioxide-lean stream, but not the carbon dioxide-rich stream
Cooling the hydrocarbon feed stream with at least a portion of the carbon dioxide-lean output stream	Cooling the light hydrocarbon stream using at least a portion of the carbon dioxide-lean stream, but not the carbon dioxide-rich stream
Carbon dioxide-lean stream	A stream with a lower carbon dioxide concentration than the hydrocarbon feed stream, whose temperature and composition do not change between the time it is separated from the light hydrocarbon stream and the time it is fed into the hydrocarbon sweetening process
Carbon dioxide-rich stream	No construction necessary
First column stream	No construction necessary
Second column stream	No construction necessary
Carbon dioxide-lean output stream	No construction necessary
Treating the hydrocarbon feed stream in a distillation column to produce a carbon dioxide-lean first column stream and a carbon dioxide-rich second column stream	Separating the hydrocarbon feed stream in a distillation column to produce a carbon dioxide-lean first column stream and a carbon dioxide-rich second column stream
Treating the first column stream in a reflux condenser to produce a reflux stream and a carbon dioxide-lean output stream	Separating the first column stream in a reflux condenser to produce a reflux stream and a carbon dioxide-lean output stream
Heavy hydrocarbons	No construction necessary

Light hydrocarbons	No construction necessary
In a reflux condenser	No construction necessary
Order of Steps	No construction necessary

The Special Master also recommended a person of ordinary skill in the art be defined as a person with a bachelor's degree in chemical engineering and at least five years of experience in general chemical process engineering. The parties have not objected to the Special Master's definition of a person of ordinary skill in the art, and thus the Court accepts that definition without further comment. Similarly, the parties have not objected to the Special Master's recommendation of the term "separate," and thus the Court accepts the Special Master's recommendation.

B. Objections

The Court now turns to the parties' specific objections.

1. "stream"

The Special Master recommended the term "stream" be construed as: "The flow of materials within a boundary." Under Oxy's proposed definition and the Special Master's recommendation, the term "stream" is defined to require the separation of different streams into flows with different boundaries, such as different pipes or hoses. Pilot objects to this construction, arguing the term should not be construed or the Court should eliminate the phrase "within a boundary" from the Special Master's recommended construction. Under Pilot's proposed definition, changing the state of part of a stream, such as by changing part of a stream to gas while the rest remains liquid, is sufficient to separate two streams, even when the state exist in a single pipe.

The specification supports the Special Master's recommendation. Each stream identified in the two flow diagrams contained in the specification corresponds to a single arrow, or one pipe. For instance, the written description provides, "process 100 separates a . . . hydrocarbon feed stream 200 into a heavy hydrocarbon stream 254, an acid gas stream 250, a carbon dioxide-rich stream 244, and a carbon dioxide-lean stream 234." Def.'s Opening Brief [#74-1] Ex. A ('148 Patent) at col. 2 ll. 47–51. In Figure 1 illustrating this embodiment, the hydrocarbon feed stream 200, an acid gas stream 250, a carbon dioxide-rich stream 244, and a carbon dioxide-lean stream 234 are separately associated with a single pipe.

Moreover, flows with multiple phases are described as one stream in the specification. *See, e.g.*, *id.* at col. 4 ll. 55–58 ("[T]he hydrocarbon feed stream 200 may be in any state including a liquid state, a vapor state, or *a combination of liquid and vapor states*.") (emphasis added). Where the patent describes the separation of phases, it illustrates these phases being separated into different pipes. For example, the written description provides, "a separator . . . separates the . . . feed stream 202 into a light fraction 220 and a heavy fraction 206," where "the light fraction 220 may be a vapor phase and the heavy fraction 206 may be a liquid phase." *Id.* at col. 4 ll. 14–18. Figure 2, which depicts this embodiment, illustrates Streams 206 and 220 in different pipes.

Pilot primarily argues the phrase "within a boundary" contradicts the claims to the extent the phrase is interpreted "to preclude multiple streams from existing in a component." Pl.'s Obj. [#97] at 3. Pilot maintains Claim 1, which provides for "separating a reflux stream from the carbon dioxide-lean stream *in* a reflux condenser," expressly contemplates two streams existing in a "component." (emphasis added). If "within a boundary" is interpreted to preclude multiple

streams from existing in a component such as a reflux condenser, Pilot argues, this construction contradicts the claim language.

But the Court finds no such contradiction. Separating two streams "in" a component simply means the separation process occurs in that component. Thus, a reflux condenser does not contain two streams, but rather separates one stream into two at the very point when the outgoing streams are leaving the component. As Oxy's expert, Dr. Rahmim, explained, separation generally does not occur "up until the very point" that outgoing streams leave the separator because engineers "design [separators] to make [them] the right size." *Markman* Hr'g Tr. [#94] at 155:7–13. Otherwise, the separator would be "over-designed" and "too big." *Id.* at 155:5–8; *see also id.* at 147:11–12 ("[I]n the real world, you don't have two streams until somebody wants to pay you for [them].").

Consequently, the Court agrees with the Special Master's recommendation and therefore OVERRULES Pilot's objections.

2. "hydrocarbon feed stream"

The Special Master recommended the term "hydrocarbon feed stream" be defined as "a hydrocarbon-containing stream prior to separation into the light hydrocarbon and the heavy hydrocarbon stream." Pilot objects to this construction, arguing the term should not be construed or the phrase "prior to separation into the light hydrocarbon stream and the heavy hydrocarbon stream" should be eliminated.

The parties' differing constructions of this term reveal their fundamental disagreement regarding what invention, precisely, is disclosed by the '148 Patent. The first sentence of Claim 1 provides for "separating a carbon dioxide-lean stream and a carbon dioxide-rich stream from a light hydrocarbon stream." Oxy argues this provides for a two-step process: first, the

hydrocarbon feed stream described in the preamble of Claim 1 ("[a] method treating hydrocarbon feed stream") is separated into a light hydrocarbon stream and a heavy hydrocarbon stream; second, the light hydrocarbon stream is separated into a carbon dioxide-rich stream and a carbon dioxide-lean stream. Pilot contends, however, that Claims 1 and 33 do not require the first step—separating the hydrocarbon feed stream into a light hydrocarbon stream and a heavy hydrocarbon stream—because Claims 2 and 34 already recite this step. Claim 2 discloses "[t]he process of claim 1 wherein the hydrocarbon feed stream is separated into the light hydrocarbon stream and a heavy hydrocarbon stream." A similar separation step is disclosed in dependent Claim 34. Pilot maintains adopting the Special Master's definition of hydrocarbon feed would run afoul of the doctrine of claim differentiation by rendering Claims 2 and 34 superfluous.

The Court agrees with Pilot the doctrine of claim differentiation counsels against adopting the Special Master's recommendation. "[T]he doctrine of claim differentiation requires that the limitations in a parent claim be construed to be different in scope from those in dependent claims." *TecSec, Inc. v. Adobe Sys. Inc.*, 658 F. App'x 570, 577 (Fed. Cir. 2016); *see also Karlin Tech., Inc. v. Surgical Dynamics, Inc.*, 177 F.3d 968, 972 (Fed. Cir. 1999) ("[L]imitations stated in dependent claims are not be read into the independent claim from which they depend."). To define the term "hydrocarbon feed stream" as "a hydrocarbon-containing stream prior to separation into the light hydrocarbon stream and the heavy hydrocarbon stream" would read into Claim 1 a step provided for in Claim 2, thereby rendering Claim 2 redundant. The same holds true for Claim 34.

The Court further agrees with Pilot that the term does not require construction. A person of ordinary skill in the art reading the claims in light of the specification would understand the meaning of this term. Accordingly, Pilot's objection is SUSTAINED.

3. "light hydrocarbon stream"

The Special Master recommended defining "light hydrocarbon feed stream" as "one of two streams resulting from the separation of the hydrocarbon feed stream, containing a decreased C3+ concentration compared to the hydrocarbon feed stream and wherein the other stream (the heavy hydrocarbon stream) is suitable for use or sale as natural gas liquids." Pilot asks the Court to reject the Special Master's recommendation and instead define the term as: "a stream where the light hydrocarbon concentration exceeds the heavy hydrocarbon concentration measured on a mole percent basis." According to Pilot, adopting the Special Master's recommendation improperly reads into Claim 1 an additional step—separating the hydrocarbon feed stream into a light hydrocarbon stream and a heavy hydrocarbon stream.

The Court again agrees with Pilot that the doctrine of claim differentiation counsels against adopting the Special Master's recommendation. Claim 2 expressly adds the separation step that the recommendation contemplates as part of Claim 1. Because "reading an additional limitation from a dependent claim into an independent claim would not only make that additional limitation superfluous, it might render the dependent claim invalid," the Court declines to adopt the Special Master's recommendation. *See Curtiss-Wright Flow Control v. Velan, Inc.*, 438 F.3d 1374, 1380 (Fed. Cir. 2006).

Moreover, Pilot's proposed definition finds support in the specification, which suggests a "light hydrocarbon feed stream" need not be composed predominately of light hydrocarbons. *See, e.g.*, Pl.'s Obj. [#97] at 6 (describing stream 224 as containing "36.14% light hydrocarbons (methane and ethane), 0.19% heavy hydrocarbons (propane and butane), and 63.17% carbon dioxide") (citing the '148 Patent col. 10 ll. 9–18). In addition, though the claim language does not specifically indicate how a stream's light hydrocarbon content may be measured, the

specification states that percentage concentration, on a mole basis, is to be used to measure "percentages herein," which includes the measure of hydrocarbon content. *See* '148 Patent col. 4 ll. 58–59. The Court therefore adopts Pilot's proposed definition of the term "light hydrocarbon stream" as "a stream where the light hydrocarbon concentration exceeds the heavy hydrocarbon concentration measured on a mole percent basis."

Accordingly, Pilot's objection is SUSTAINED.

4. Cooling Terms

Claim 1 refers to cooling the light hydrocarbon stream with "at least a portion of the carbon dioxide-lean stream," and Claim 33 refers to cooling the hydrocarbon feed stream with at least a portion of the carbon dioxide-lean output stream. The Special Master recommended defining these terms so that "at least a portion of the carbon dioxide-lean stream, but not the carbon dioxide-rich stream[,]" participate in the cooling.

Pilot primarily argues the Special Master's addition of "but not the carbon dioxide-rich stream" is unsound because the specification does not "rule out" use of the carbon dioxide-rich stream as a cooling source. Pl.'s Obj. [#97] at 11. As Pilot points out, the specification states "the carbon dioxide-rich stream 244 described herein may be vented, transported, sold, or *used for other purposes*[.]" '148 Patent at col. 5 ll. 49–51 (emphasis added).

Though the specification does not expressly curtail the use of the carbon dioxide-rich stream for cooling, it does not describe the rich stream being used for such a purpose. In fact, the specification provides for "further cool[ing] the cooled carbon dioxide-rich stream" before injecting it into a well. *Id.* at col. 3 ll. 52–59. Moreover, when the cooling function is described in the specification, it is the carbon dioxide-lean stream that performs the cooling. *Id.* at col. 2 ll. 15–16 ("cooling the compressed light hydrocarbon stream using the carbon dioxide-lean

stream"); *id.* at col. 3 ll. 15–18 (same); *id.* at col. 4 ll. 1–4 (same). Similarly, the claims themselves provide for cooling by "at least a portion of the carbon dioxide-lean stream," but never identify any other stream used for cooling.

Moreover, the specification teaches away from using the carbon dioxide-rich stream for cooling, because doing so would undermine a stated purpose of the patented process. The specification indicates that one of the purposes of the patent is to create "pipeline-grade liquefied carbon dioxide" like the carbon dioxide-rich stream. *Id.* at col. 9 ll. 3–16; *see also Markman* Hr'g Tr. [#94] at 168:25–169:1 (explaining "[t]his pipeline grade liquefied carbon dioxide is the same as the . . . rich stream"). At the *Markman* hearing, Dr. Rahmim testified that using the carbon dioxide-rich stream to help with cooling would negate the stated benefit of producing pipeline grade liquefied carbon dioxide. The Federal Circuit has held such teaching away may be considered in construing a term. *See Astrazeneca AB, Aktiebolaget Hassle, KBI-E, Inc. v. Mut. Pharm. Co.*, 384 F.3d 1333, 1340 (Fed. Cir. 2004) (construing claims to exclude a feature which the specification did not teach, and in fact, criticized).

The prosecution history provides further support for the Special Master's construction. During prosecution of the patent, the examiner allowed the patent over prior art because "the prior art of record does not disclose or suggest a process for separating carbon dioxide from a hydrocarbon feed stream wherein the light hydrocarbon stream is cooled by heat exchanging with the carbon dioxide lean stream." Def.'s Opening Brief [#74-1] Ex. C (Examiner's Reasons for Allowance) at 288–89. Pilot did not dispute the examiner's statement or clarify the rich stream could also participated in the cooling. Failing to do so suggests Pilot acquiesced to the examiner's view that the inventive feature of the patented process is the cooling performed by the carbon dioxide-lean stream. *See, e.g., Elkay Mfg. Co. v. Ebco Mfg. Co.*, 192 F.3d 973, 979

(Fed. Cir. 1999) (determining the patentee disavowed a potential interpretation of its claim limitation, in part because the patentee failed to respond to the examiner's reasons for allowance eliminating a different construction of the claim).

The Court finds the claim language, specification, and prosecution history all support Oxy's position and the Special Master's recommendation. Pilot's objections are therefore OVERRULED.

5. "carbon dioxide-lean stream"

The Special Master defined "carbon dioxide-lean stream" as "a stream with a lower carbon dioxide concentration than the hydrocarbon feed stream, whose temperature and composition do not change between the time it is separated from the light hydrocarbon stream and the time it is fed into the hydrocarbon sweetening process." Pilot objects to this recommendation, arguing instead the term should be construed as "a stream having a carbon dioxide concentration, measured on a mole percent basis, that is less than the carbon dioxide concentration of the hydrocarbon feed stream."

Oxy contends the principles of claim differentiation counsel in favor of adopting the Special Master's recommendation. Claim 1 provides for "a carbon dioxide-lean stream" that is created by "separating" "a light hydrocarbon stream," after which the "carbon dioxide-lean stream" is fed "into a hydrocarbon sweetening process." Dependent Claims 5 and 10 provide for the "process of claim 1 further comprising changing the temperature of the carbon dioxide-lean stream" and "wherein the carbon dioxide-lean stream has a different composition after its separation from the light hydrocarbon stream," all before the lean stream is fed into the hydrocarbon sweetening process. Thus, in Claims 5 and 10, the composition and temperature of

the carbon dioxide-lean stream changes after the separation provided for in Claim 1 occurs and before at least a portion of the lean stream is fed into the hydrocarbon sweetening process.

The Court is not convinced by Oxy's argument, however. Defining "carbon dioxide-lean stream" as a stream "whose temperature and composition do not change between the time it is separated from the light hydrocarbon stream and the time it is fed into the hydrocarbon sweetening process" mandates a particular order of steps in Claim 1. In order for the composition of the carbon dioxide-lean stream to not change between the time it is separated from the light hydrocarbon stream and the time it is fed into the hydrocarbon sweetening process, Step 5 in Claim 1 must occur after Step 1. As discussed below, the Court finds that neither the claim nor the specification prescribes the particular order in which the lean stream must be fed into a sweetening process. *See infra* Section II.B.11. Construing this term so as to mandate a particular order of steps would therefore be improper. Pilot's objection to the temperature and composition limitation in the Special Master's recommended construction is SUSTAINED.

Without the temperature and composition limitation, the Special Master's recommended resembles Pilot's proposed construction, which defines the carbon dioxide-lean stream relative to the carbon dioxide concentration of the hydrocarbon feed stream. Pilot's proposal adds the additional instruction that the carbon dioxide concentration should be measured on a mole percent basis. For the same reasons stated above, *see supra* Section II.B.3, the Court finds the specification supports Pilot's proposed method of measurement. The Court therefore adopts Pilot's proposed construction of the term "carbon dioxide-lean stream."

6. "first column stream" and "second column stream"

The Special Master recommended no construction of these terms was necessary. These terms are found in Claim 33, which recites, in relevant part, "treating the hydrocarbon feed

stream in a distillation column to produce a carbon dioxide-lean first column stream and a carbon dioxide-rich second column stream" and "treating the first column stream in a reflux condenser to produce a reflux stream a carbon dioxide-lean output stream." In objecting to this recommendation, Oxy argues the Court should hold these terms indefinite because they are not found in the patent, and without clarification, one of skill in the art would not understand the meaning of these terms.

Claim 33 describes the "first column stream" as "carbon dioxide-lean" and the "second column stream" as "carbon dioxide-rich," and further provides that the "first column stream" and "second column stream" are produced by separating the "hydrocarbon feed stream." At the *Markman* hearing, the inventor and Pilot's expert, Mr. Prim, identified streams 226 and 236 in Figures 1 and 2 as the "first column stream" and the "second column stream," respectively. *Markman* Hr'g Tr. [#94] at 85:13, 85:21–23. The specification describes stream 226 and the "light effluent stream" and stream 236 as the "heavy effluent stream." '148 Patent at col. 3 ll. 27–28. According to Dr. Rahmim, Oxy's expert, a person of ordinary skill in the art would not assume a light effluent stream is a first column stream or a heavy effluent stream is a second column stream. *Markman* Hr'g Tr. [#94] at 185:18–19.

The Court is not persuaded the concepts of "first column stream" and "second column stream" are confusing. Based on the plain language of Claim 33 and the context in which the disputed terms appear, the Court finds a person of ordinary skill in the art has the ability to understand a first effluent stream produced in a column could be described as a "first column stream." This same reasoning holds true for "second column stream."

The Court agrees with the Special Master's recommendation and therefore OVERRULES Oxy's objections.

7. "carbon dioxide-lean output stream"

The Special Master recommended no construction of this term was necessary. Claim 33 uses this term in reciting: "treating the first column stream in a reflux condenser to produce a reflux stream and a carbon dioxide-lean output stream," "cooling the hydrocarbon feed stream with at least a portion of the carbon dioxide-lean output stream," and "feeding at least a portion of the carbon dioxide-lean output stream into a hydrocarbon sweetening process."

Oxy's main objection to this recommendation appears to be that the term "carbon dioxide-lean output stream" is indefinite based on the doctrine of claim differentiation because Claim 33 provides for a "carbon dioxide-lean *output* stream," while the other claims in the patent provide for a "carbon dioxide-lean stream." The Court is not convinced the claim scope of this term is indefinite. The addition of the word "output" to the term "carbon dioxide-lean stream" is not so confusing that a person of ordinary skill in the art would be unable to ascertain its meaning in the context of the patent.

Based on the foregoing, the Court agrees with the Special Master's recommendation and therefore OVERRULES Oxy's objections.

9. "treating"

The Special Master recommended the term "treating" be construed as "separating." Claim 33 provides for a similar sequence of steps as Claim 1 but uses the word "treating" in the place of "separating." For instance, where Claim 1 recites "separating a carbon dioxide-lean stream and a carbon dioxide-rich stream from a light hydrocarbon stream," Claim 33 recites "treating the hydrocarbon feed stream in a distillation column to produce a carbon dioxide-lean fist column stream and a carbon dioxide-rich second column stream."

Pilot objects to the Special Master's recommendation, arguing that construing "treating" as "separating" confuses the meaning of different terms, because other claims in the '148 Patent, such as Claim 1, use the word "separating." According to Pilot, the use of a different term in Claim 33—"treating"—signifies a different meaning. *See CAE Screenplates Inc. v. Heinrich Fiedler GmbH*, 224 F.3d 1308, 1317 (Fed. Cir. 2000) ("In the absence of evidence to the contrary, we must presume that the use of these different terms in the claims connotes different meanings.").

Though Pilot suggests "separating" may be a form of "treating," it does not otherwise specify the "different meaning" of the word "treating." To the extent Pilot contends "treating" provides for an additional function beyond "separation," that function was not described in the patent in compliance with Section 112 of the Patent Act. Moreover, the specification and claims, when considered together, suggest the terms are, in fact, synonymous in the patent. The term "treating" is not found in the specification, only in Claim 33. As noted, Claim 33 recites "treating" a hydrocarbon feed stream and a first column stream "in a distillation column" and "in a reflux condenser," respectively. '148 Patent at col. 20 ll. 16–21. The only function the specification ascribes to a "distillation column" and a "reflux condenser" is separating. *Id.* at col. 7 ll. 8–11, 15–16, 18–20.

Based on the context in which the term "treating" is used in the patent, the Court agrees with the Special Master's construction of the term and therefore OVERRULES Pilot's objections.

10. "in a reflux condenser"

The Special Master recommended no construction of this term was necessary. Claim 1 provides for "separating . . . in a reflux condenser," and Claim 33 provides for "treating the first

column stream in a reflux condenser[.]" Pilot argues the Court should reject the Special Master's recommendation and adopt its proposed construction, where "in a reflux condenser" is defined as "in equipment having a heat exchanger, a separator, and a pump."

As an initial matter, the Court notes that Pilot's belated interest in construing this term comes after the parties submitted their *Markman* briefs and joint claim construction chart, and after the Special Master held both a tutorial hearing and a *Markman* hearing. Failing to raise these arguments sooner potentially prejudiced Oxy, which relied on Pilot's prior tactical decision in developing its own litigation position. But the Court need not find Pilot waived this argument in order to dispose of it.

The specification describes a "condenser" as "any vessel that separates an inlet stream into a substantially vapor stream and a substantially liquid stream." '148 Patent at col. 7 ll. 36–37. The plain meaning of "any vessel" contemplates one piece of equipment, not a combination of multiple vessels. Pilot points to Mr. Prim's testimony at the *Markman* hearing that the HYSIS program was used to create the figures in the patent, and the symbol used in Figure 2 of the patent to indicate a reflux condenser is a symbol that means a heat exchange, a separator, and a pump in the HYSIS convention. *Markman* Hr'g Tr. [#94] at 72:21–23. But Mr. Prim's argument concerns only the figures of the '148 Patent, not the language of the specification. And as Oxy points out, the specification does not list a pump as part of the reflux condenser. *See* '148 Patent at col. 7 ll. 31–43.

The Court agrees with the Special Master's recommendation, and Pilot's objections are OVERRULED.

11. Order of Steps

The Special Master recommended no construction of the order of steps as to Claim 1 is necessary. In its objections, Pilot argues the patent mandates Step 1, 2, and 3 occur in the order they appear in the claim, Step 4 follows at least Step 1, and Step 5 follows the other steps. Noticeably absent from its objection, however, is any evidence that either the claim or the specification prescribe the particular order in which the lean stream must be fed into a sweetening process. Consequently, the Court agrees with the Special Master's recommendation, and Pilot's objections are OVERRULED.

12. "carbon dioxide-rich stream," "heavy hydrocarbons," and "light hydrocarbons"

The Special Master recommended no construction of these terms was necessary. As Oxy points out, the terms "heavy hydrocarbons" and "light hydrocarbons" are not claim terms and therefore do not require construction. Moreover, the term "carbon dioxide-rich stream" is not in dispute and thus should not be construed. *See PSC Comput. Prod., Inc. v. Foxconn Int'l, Inc.*, 355 F.3d 1353, 1357 (Fed. Cir. 2004) ("Although an infringement analysis typically begins with claim construction, . . . the district court here did not construe the claims of the '239 patent because their meaning is not disputed.").

Conclusion

The parties' objections to the Special Master's recommended constructions are OVERRULED IN PART and SUSTAINED IN PART, as described in this Order, and the Special Master's recommended constructions are ACCEPTED AS MODIFIED.

Accordingly,

IT IS ORDERED that Oxy's Objections [#96] are OVERRULED;

IT IS FURTHER ORDERED that Pilot's Objections [#97] are OVERRULED IN PART and SUSTAINED IN PART as described in this Order; and

IT IS FINALLY ORDERED that the Report and Recommendation of the Special Master [#95] is ACCEPTED AS MODIFIED. The following chart lists the Court's construction of the disputed claim terms:

Claim Term	Construction
Stream	The flow of materials within a boundary
Separate	No construction necessary
Hydrocarbon feed stream	No construction necessary
Light hydrocarbon feed stream	A stream where the light hydrocarbon concentration exceeds the heavy hydrocarbon concentration, measured on a mole percent basis
Cooling the light hydrocarbon stream using at least a portion of the carbon dioxide-lean stream	Cooling the light hydrocarbon stream using at least a portion of the carbon dioxide-lean stream, but not the carbon dioxide-rich stream
Cooling the hydrocarbon feed stream with at least a portion of the carbon dioxide-lean output stream	Cooling the light hydrocarbon stream using at least a portion of the carbon dioxide-lean stream, but not the carbon dioxide-rich stream
Carbon dioxide-lean stream	A stream having a carbon dioxide concentration, measured on a mole percent basis, that is less than the carbon dioxide concentration of the hydrocarbon feed stream
Carbon dioxide-rich stream	No construction necessary
First column stream	No construction necessary
Second column stream	No construction necessary
Carbon dioxide-lean output stream	No construction necessary
Treating the hydrocarbon feed stream in a distillation column to produce a carbon dioxide-lean first column stream and a carbon dioxide-rich second column stream	Separating the hydrocarbon feed stream in a distillation column to produce a carbon dioxide-lean first column stream and a carbon dioxide-rich second column stream
Treating the first column stream in a reflux condenser to produce a reflux stream and a	Separating the first column stream in a reflux condenser to produce a reflux stream and a

carbon dioxide-lean output stream	carbon dioxide-lean output stream
Heavy hydrocarbons	No construction necessary
Light hydrocarbons	No construction necessary
In a reflux condenser	No construction necessary

SIGNED this the 25th day of August 2017.

SAM SPARKS
UNITED STATES DISTRICT JUDGE